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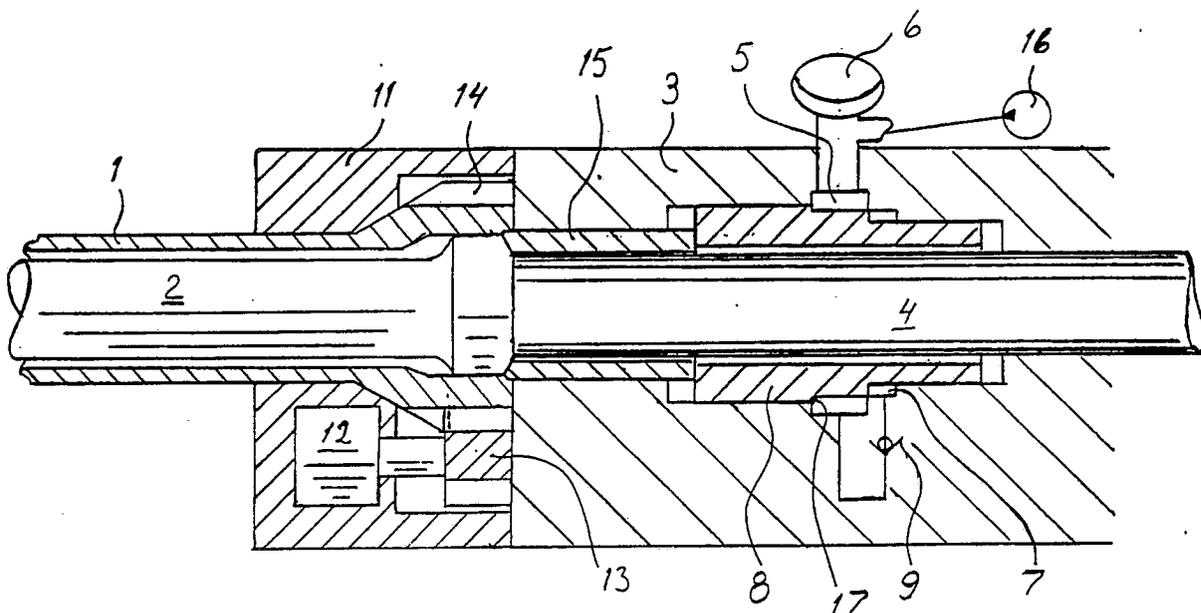
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(54) **Device in impact machines.**

(57) The device comprises a first chamber (5) which is connected to an accumulator (6) and the pressure of which is used to hold together a set of rods (2)

forming part of the drill tool. Furthermore there is a second chamber (7) to damp the recoil from the set of rods.



**EP 0 389 454 A1**

### Device in impact machines

The present invention relates to a device in impact machines for drilling, preferably in rock, by means of a drill string comprising a set of tubes and a set of rods arranged in the set of tubes.

When drilling with drill strings of the above mentioned kind the problem arises that the rods forming part of the set of rods not always abut against each other when the hammer piston hits the rearmost part of the set of rods. This results therein that the energy of the hammer piston only partly is transferred to the drill bit at the other end of the drill string.

The present invention, which is defined in the subsequent claims, aims at achieving a device of the kind mentioned above where the rods forming part of the set of rods abut against each other when the hammer piston hits. The invention furthermore aims at achieving an efficient damping of the recoil without jeopardizing the abutment between the rods of the set of rods. This problem is substantially larger with this type of drill string than with a drill string where the rods are connected with each other since the energy of the recoil from the rock substantially entirely is transferred to the rearmost part in the set of rods. This part, therefore, obtains a large kinetic energy and will thus move far. If this occurs it will take a long time before the rods in the set of rods abut against each other again. This means that drilling can only occur with low frequency if the rods are to be held against each other during the drilling. With the present invention it is possible to hold the rods against each other also at high frequencies.

An embodiment of the invention is described below with reference to the accompanying drawing which schematically shows a section through a device according to the invention.

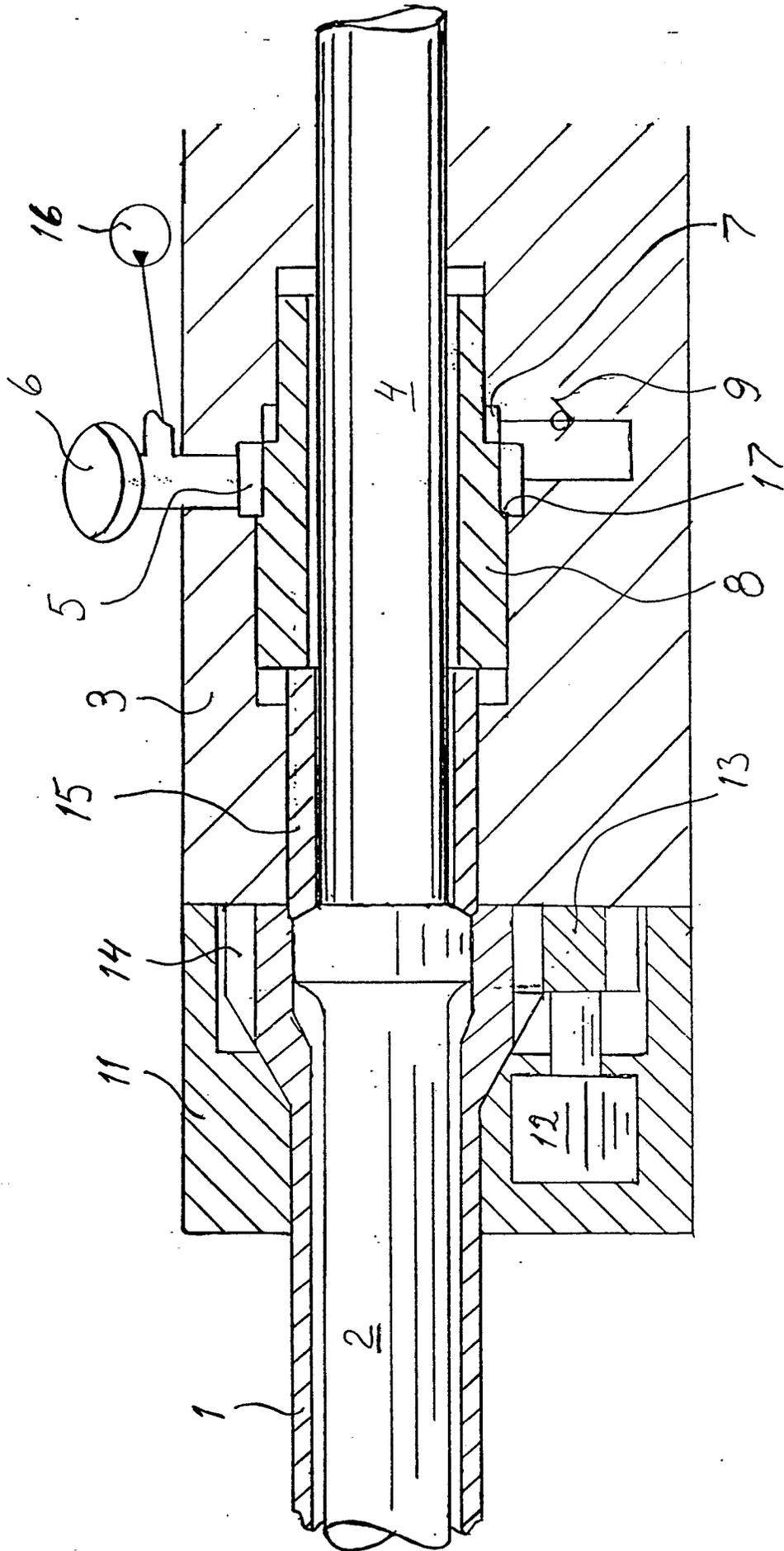
The device shown in the drawing comprises a machine housing 3 on which a front part 11 is secured. The drilling device comprises a drill string comprising a set of tubes, in the drawing represented by the drill sleeve 1 which forms the rearmost part, and a set of rods 2, which in the drawing is represented by an adapter 2 arranged in the machine. A not shown drill bit is arranged at the front end of the drill string. The drill bit is rotated by means of the set of tubes which in its turn is rotated by a rotary motor 12 via a toothed wheel 13 which gears with teeth 14 on the drill sleeve 1. A hammer piston 4 is movable to-and-fro in the machine housing 3 in the usual way. The hammer piston transfers its energy to the adapter in the set of rods. This energy is then transferred from rod to rod in the set of rods and from the set rods to the drill bit. A sleeve 15 and a piston 8 are slidably

arranged in the machine housing 3. These transfer to the adapter 2 a force determined by the pressure in a first chamber 5. This pressure acts on a forwardly directed surface 17. This force is used during drilling to hold the rods of the set of rods together. Chamber 5 is connected to an accumulator 6 which is supplied with pressure liquid from a pressure liquid source 16. Piston 8 is with close fit movable into a second chamber 7. This means that the recoil from the rock is efficiently damped because liquid is pressed out through the narrow slot between piston 8 and the machine housing 3. In order to avoid cavitation when piston 8 moves out of chamber 7 a check valve 9 is arranged between the first and second chambers and directed such that liquid flow is allowed from first chamber 5 to second chamber 7.

### Claims

1. Device in impact machines for drilling by means of a drill string comprising a set of tubes (1) for transferring rotation to a drill bit and a set of rods (2) arranged centrally in the set of tubes for transferring impact energy from a hammer piston (4) movable to-and-fro in a machine housing (3) to said drill bit, **characterized** in that said machine housing (3) comprises a first chamber (5) connected to an accumulator (6), a second chamber (7) and a piston (8), whereby said piston transfers a force determined by the liquid pressure in said first chamber to said set of rods (2) and is movable into said second chamber with close fit to entrap a liquid volume damping the recoil from said set of rods.

2. Device according to claim 1, **characterized** in that a check valve (9) is arranged between said first (5) and second (7) chambers and that the check valve is directed such that it allows liquid flow from said first chamber to said second chamber.





DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
A	EP-A-0 080 446 (ATLAS COPCO) * Page 2, line 34 - page 3, line 15; page 5, lines 16-31; figures * ----	1	E 21 B 6/00 B 25 D 17/24 E 21 C 1/12 E 21 B 7/20
A	EP-A-0 133 161 (SIG) * Abstract; figures * ----	1	
A	FR-A-2 596 681 (EIMCO-SECOMA) * Abstract; figures; page 7, lines 11-37 * ----	1	
A	FR-A-2 598 111 (OY TAMPELLA) * Abstract; figures * ----	1	
A	US-H- 537 709 (LUNDSTROM) * Column 2, lines 18-25; figures * -----	1	
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			E 21 B B 25 D E 21 C
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 01-06-1990	Examiner WEIAND T.
CATEGORY OF CITED DOCUMENTS		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons ..... & : member of the same patent family, corresponding document	
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